DETAILED ACTION

Response to Arguments

1. Applicant contends that claim 1, lines 22-51, are "goals the method favors, rather than constraints that are required" (Remark, p.4, para. 6), and "preferred compromises for the best practical solution, yet makes it clear that meeting the stated criteria is not required" (Remard, p.5, para. 1). Examiner will herein consider the limitation(s) in claim 1, lines 22-51, as merely preference or preferential or preferred, without any patentable weight. Similarly in claims 2,41,108.

2. Examiner notes that although claim 1, lines 22-51, have been exempt from a prior art rejection because no patentable weight is given to preference(s), it does not render the limitation(s) free from an indefinite rejection regarding clarity. See 35 U.S.C. 112 rejection below. Similarly in claims, 2,41,108.

3. Examiner will follow Applicant's contention that claims 1,2,41 and 108 "are now distinctly 'method' claims"; and claims 101 and 184-187 "are now distinctly 'apparatus' claims". Remark, p.3, para. 4.

Drawings

4. Figure 6B should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

5. Fig. 13B, introduced on p.37 of the Specification, is missing.

6. In Fig. 15, 123 is mislabeled. –ADC—should be replaced with "DAC", as introduced on p.37 of the Specification.

Specification

7. The disclosure is objected to because of the following informalities: On p.31, para. 3, line 2, misspelled –reduncantly—should be replaced with "redundantly".

Appropriate correction is required.

8. The disclosure is objected to because of the following informalities: On p.36, -- Fig. 3-- should be replaced to clarify Fig. 3A and 3B.

Appropriate correction is required.

9. The disclosure is objected to because of the following informalities: On p.37, -- Fig. 13A—should be replace with "Fig. 13".

Appropriate correction is required.

Claim Objections

10. Claim 1 is objected to because of the following informalities: In line 42, Examiner suggests replacing –only f if—with "only if". Appropriate correction is required.

11. Claim 2 is objected to because of the following informalities: In line 4, SINR has to be spelled out when used for the first time. Examiner suggests Applicant to revisit claim language of all claims and spell out all initials when the initials are used for the very first time. Appropriate correction is required.

12. Claim 32 is objected to because of the following informalities: Examiner suggests removing the parentheses to make the limitation more positive. Appropriate correction is required.

13. Claim 34 is objected to because of the following informalities: There are two occurrences of claim 34. Appropriate correction is required.

14. Claim 38 is objected to because of the following informalities: Misspelled – heterogenous—should be replaced with "heterogeneous". Appropriate correction is required.

15. The disclosure is objected to because of the following informalities: On p.37, in description of Fig. 16, --recieves—should be replaced with "receives"; and – antennaeand—should be replaced with "antennae and".

Appropriate correction is required.

16. Claim 101 is objected to because of the following informalities: Examiner suggests removing one of the --A wireless electromagnetic communications network— in lines 1-3. Appropriate correction is required.

17. Claim 185 is objected to because of the following informalities: In line 2, -- comprising,-- should be replaced with "comprising:". Appropriate correction is required.

Claim Rejections - 35 USC § 112

18. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

19. **Claims 1-16,18-40,110,115-179,182,183** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With regard to claims 1 and 2, it is unclear how subsets can be compared with means, or whether each subset is a diversity capacity and therefore subsets are means, or whether diversity capacity means is means for diversity capacity. Examiner suggests dropping the word –means— to equate subsets with diversity capacity because 1.

According to Remark, p.5, para. 5, the "one-to-one ratio" is a diversity capacity, not – diversity capacity means -- and 2. According to Remark, p.5, para. 5, "the count between diversity capability means" is not disclosed anywhere in the claim language. See also –diversity capability means capacity—in claim 110.

With regard to claims 13-15, it is unclear whether it is part of the method claim or part of the criteria/preference, especially with the use of the word –may--.

With regard to claims 23-25, it is unclear whether it is part of the method claim or part of the criteria/preference because "substep of subdividing ..." falls within the criteria in claim 1, lines 22-51 and by Applicant's admission in Remark, p.4, para. 6, the preference is not given any patentable weight.

With regard to claim 27, it is unclear what is –including said as network information—and whether it is including as network information.

With regard to claim 110, it is unclear what is –diversity capability means capacity—or whether that is the same as diversity capability.

With regard to claim 115, it is unclear what is –a dynamics-resistant multitone element--.

20. There is insufficient antecedent basis for this limitation in the claim.

Claim 1 recites the limitation "said spatially diverse antennae array" in lines 8-9.

Claim 23 recites the limitation in lines 2-5. However, the substep of subdividing

21. Regarding claim 1, the word "means" is preceded by the word(s) "diversity capability" in an attempt to use a "means" clause to recite a claim element as a means for performing a specified function. However, since no function is specified by the word(s) preceding "means," it is impossible to determine the equivalents of the element,

as required by 35 U.S.C. 112, sixth paragraph. See *Ex parte Klumb*, 159 USPQ 694 (Bd. App. 1967).

22. Claims 116-179,182,183 provide for the use of a method as described in claim 1 or an apparatus as described in claim 101, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Claims 116-179,182,183 are rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd.* v. *Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

Claim Rejections - 35 USC § 102

23. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

24. **Claims 1,2,6-10,14,15,19,20,23-32,39,41,45-47,101,102,105,108,110,115,185-187** are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Paulraj et al. (U.S. Pat No. 6,351,499).

With regard to claim 1, Paulraj discloses

organizing a wireless electromagnetic communications network **(Fig. 1)**;

linking (**channels)** said set of nodes **(BTS 12 sends transmit signals to all receive units 14 via channels 22A and 22B, col. 5, lines 63-64; see also Fig. 1)** according to design rules **(spatial multiplexing, diversity, beam-forming (transmit), interference canceling (receive), array gain (receive), col. 6, lines 12-13 and lines 15-16) (see also any one or more of the available multiple access techniques such as TDMA, FDMA, CDMA, OFDMA, col. 5, lines 11-14)**;

transmitting **(transmit)**, in said wireless electromagnetic communications network, independent information from each node belonging to a first proper subset **(BTS)**, to one or more receiving nodes belonging to a second proper subset **(receive units)** that are viewable from the transmitting node **(BTS)**;

processing independently **(Receive units are equipped with antenna arrays of N receive antennas, col. 5, lines 60-61; see also Fig. 2 and 4)**, in said wireless electromagnetic communications network, at each receiving node belonging to said second proper subset **(receiving units)**, information transmitted from one or more nodes belonging to said first proper subset **(BTS)**;

and,

dynamically adapting the diversity capability means and said proper subsets to optimize said network **([adaptive antenna] beams are adjusted dynamically, col. 2,**

line 56; adaptively changing multiple antenna systems, col. 2, line 61)(multiple antennas for diversity, col. 2 , line 50).

With regard to claim 2, see analysis for claim 1.

With regard to claim 6, Paulraj further discloses designing the network such that reciprocal symmetry **(channel is reciprocal, col. 7, line 8)** exists for each pairing of uplink receive and downlink receive proper subsets.

With regard to claim 7, see analysis for claim 6.

With regard to claim 8, Paulraj further discloses TDD communication protocols **(TDD, col. 7, line 8; see also TDMA, col. 5, line 12)**.

With regard to claim 9, Paulraj further discloses FDD communication protocols **(FDMA, CDMA, OFDMA, col. 5, line13)**.

With regard to claim 10, Paulraj further discloses simplex communication protocols **(from BTS to receive units)**.

With regard to claim 14, Paulraj further discloses a network that dynamically reassign a node from one proper subset to another **(different cells) (units outside cell 24, col. 6, line 2)**.

With regard to claim 15, see analysis for claim 14.

With regard to claim 19, Paulraj further discloses designing the topological, physical layout of nodes to support the favored criteria within the node's diversity capability means' limitation **(space-time coding, col. 7, line 20)**.

With regard to claim 20, see analysis for claim 19.

With regard to claim 23, Paulraj further discloses spatial diversity of antennae **(spatial multiplexing, col. 2, line 31, and multiple antennas for diversity, col. 2,line 50).**

With regard to claim 24, Paulraj further discloses polarization diversity of antennae **(multiplexing) (see also adaptive modulation and/or coding, col. 2, line 19 and 66)**.

With regard to claim 25, see analyses for claims 23 and 24.

With regard to claim 26, Paulraj discloses incorporating network control and feedback aspects as part of the signal encoding process **(feedback is indicated by dashed line 42 in Fig. 2, col. 6, line 44)**.

With regard to claim 27, Paulraj further discloses incorporating network control and feedback aspects as part of the signal encoding process **(see analysis for claim 26)** and including as networking information in one direction of the signaling and optimization process **(dashed line in one direction)**; using the perceived environmental condition's effect upon the signals in the other direction of the signaling and optimization process **(quality parameter, col. 6, lines 40-41)**.

With regard to claim 28, Paulraj further discloses adjusting the diversity capacity means use between any proper sets of nodes by rerouting any active line based on perceived unacceptable SINR experienced on that active link **(BER versus SINR, col. 8, lines 3-4)** and the existence of an alternative available link **(proper S-T codes, values of k and G(z) matrix sets)** using said adjusted diversity means **(database contains the necessary performance curves to select the proper S-T codes, values of k and G(z) matrix sets to use, col. 8, lines 19-21)**.

With regard to claim 29, Paulraj further discloses switching a particular node from one proper subset to another due to changes in the external environment affecting links between that node and other nodes in the network **(quality parameter; see also proper S-T codes, values of k and G(z) matrix sets)**.

With regard to claim 30, Paulraj further discloses dynamically reshuffling proper subsets to more closely attain network objectives by taking advantage of diversity capability means availability **(proper S-T codes, values of k and G(z) matrix sets)**.

With regard to claim 31, Paulraj further discloses dynamically reshuffling proper subsets to more closely attain network objectives by accounting for node changes **(proper S-T codes, values of k and G(z) matrix sets)**.

With regard to claim 32, Paulraj further discloses adding diversity capability means to a node, adding a new node within the field of view of another node **(different cells)**, removing a node from the network, temporarily or permanently, or losing diversity capability at a node **(traveling between cells) (units outside cell 24, col. 6, line 2)**.

With regard to claim 39, Paulraj further discloses using as many of the available diversity capability means as are needed for traffic between any two nodes from 1 to NumChannels, where NumChannels equals the maximal diversity capability means between said two nodes **(subject to conditions that 1<=k<=N and also K<=M, col. 6, line 61)**.

With regard to claim 41, see analyses for claims 1,8,9,10.

With regard to claim 45, see analysis for claim 4.

With regard to claim 46, see analyses for claims 4,5,28.

With regard to claim 47, see analysis for claim 28.

With regard to claim 101, see analyses for claims 1 and 41.

With regard to claim 102, Paulraj further discloses means for scheduling according to a demand-assigned **(Specifically, the beams are adjusted as a function of a received signal indicator in order to maximize signal quality and reduce the system interference; see also [adaptive antenna] beams are adjusted dynamically, col. 2, line 56; adaptively changing multiple antenna systems, col. 2, line 61)(multiple antennas for diversity, col. 2 , line 50)**, multiple-access **(multiple antennas for diversity, col. 2, line 50)** algorithm **(function)**.

With regard to claim 105, Paulraj further discloses

matching **(adaptive and optimal selection, col. 6, line 22)** each transceiver's degrees of freedom (DOF) **(order of spatial multiplexing, col. 6, lines 22-23)** to the nodes in the possible link directions;

equalizing **(optimal selection)** those links to provide node-equivalent uplink and downlink capacity **(order of diversity as well as rate of coding and bit-loading over transmit antenna array to [receive] antenna array, col. 6, lines 23-24)**.

With regard to claim 108, see analysis for claims 1,2,41.

With regard to claim 110, Paulraj further discloses a network that optimizes for QoS **(signal quality, col. 6, line 8)**.

With regard to claim 115, Paulraj further discloses a dynamics-resistant multitone element. **(receive unit 14D)**.

With regard to claim 185, see analyses for claims 1,2,41.

With regard to claim 186, Paulraj discloses tone and slot interleaving **(space-time coding, col. 7, line 20)**.

With regard to claim 187, Paulraj discloses a Turbo codec **(space-time coder 65, col. 7, line 12)**.

Claim Rejections - 35 USC § 103

25. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

26. **Claims 3-5,21,22,44** are rejected under 35 U.S.C. 103(a) as being unpatentable over Paulraj in view of Scherzer (U.S. Pat No. 6,108,565).

With regard to claim 3, Paulraj discloses a method as in claim 1. However, Paulraj fails to explicitly show using substantive null steering to minimize SINR between nodes transmitting and receiving information.

In an analogous art of wireless communication systems, Scherzer discloses using substantive null steering **(nulls)** to minimize SINR **(cochannel interference)** between nodes transmitting **(base station, col. 2, line 58)** and receiving **(subscribers)** information **("The beams can also be selected to direct nulls to other subscribers so that cochannel interference is reduced", col. 2, lines 63-64)**.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include using substantive null steering to minimize SINR between nodes transmitting and receiving information in Paulraj's method. The suggestion/motivation for doing so would have been to exploit the spatial domain. Scherzer, col. 2, line 57. Therefore, it would have been obvious to combine Scherzer with Paulraj for the benefit of using substantive null steering to minimize SINR between nodes transmitting and receiving information, to obtain the invention as specified in claim 3.

With regard to claim 4, Paulraj discloses a method as in claim 1. However, Paulraj fails to explicitly show using max-SINR null- and beam-steering to minimize intra-network interference.

In an analogous art of wireless communication systems, Scherzer discloses using max-SINR **(maximum strength)** null- **(nulls)** and beam-steering **(selected to direct)** to minimize intra-network interference **(cochannel interference) ("These**

beams transmit an information signal over multiple paths so that the signal arrives to the subscriber with maximum strength. The beams can also be selected to direct nulls to other subscribers so that cochannel interference is reduced.", col. 2, lines 61-64).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include using max-SINR null- and beam-steering to minimize intra-network interference in Paulraj's method. The suggestion/motivation for doing so would have been to exploit the spatial domain. Scherzer, col. 2, line 57. Therefore, it would have been obvious to combine Scherzer with Paulraj for the benefit of using max-SINR null- and beam-steering to minimize intra-network interference, to obtain the invention as specified in claim 4.

With regard to claim 5, Paulraj discloses a method as in claim 1. However, Paulraj fails to explicitly show using MMSE null- and beam-steering to minimize intra-network interference.

In an analogous art of wireless communication systems, Scherzer discloses MMSE **(col. 3, line 39)**. See also analysis for claim 4

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include MMSE in Paulraj's method. The suggestion/motivation for doing so would have been to exploit the spatial domain. Scherzer, col. 2, line 57. Therefore, it would have been obvious to combine Scherzer with Paulraj for the benefit of MMSE, to obtain the invention as specified in claim 5.

With regard to claim 21, Paulraj discloses a method as in claim 1. Paulraj further discloses multiple frequency channels. However, Paulraj fails to explicitly show sending redundant data transmissions.

In an analogous art of wireless communication systems, Scherzer discloses sending redundant data transmissions **(broadcast) ("... information is transmitted from a base station to subscribers by broadcasting ... the subscribers transmit information back to the base station by broadcasting ...", col. 1, lines 23-27)**.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include sending redundant data transmissions in Paulraj's method. The suggestion/motivation for doing so would have been to exploit the spatial domain. Scherzer, col. 2, line 57. Therefore, it would have been obvious to combine Scherzer with Paulraj for the benefit of MMSE, to obtain the invention as specified in claim 21.

With regard to claim 22, Paulraj discloses a method as in claim 1. Paulraj further discloses multiple simultaneous or differential time slots. However, Paulraj fails to explicitly show sending redundant data transmissions. See analysis for claim 21.

With regard to claim 44, see analysis for claim 5.

27. **Claim 11** is rejected under 35 U.S.C. 103(a) as being unpatentable over Paulraj in view of Wu (U.S. Pat No. 6,839,469).

With regard to claim 11, Paulraj discloses a method as in claim 1. However, Paulraj fails to explicitly show a network that uses random access packets, and receive

and transmit operations that are all carried out on the same frequency channels for each link.

In an analogous art of multi-channel communication system, Wu discloses a network that uses random access packets **(in a random manner, col. 3, line 5)**, and receive and transmit operations that are all carried out on the same frequency channels for each link **("contentional systems ... share one or more common channels", col. 1, line 44)**.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include a network that uses random access packets, and receive and transmit operations that are all carried out on the same frequency channels for each link. The suggestion/motivation for doing so would have been to provide for multi-channel ALOHA protocol. Wu, col. 3, line 62. Therefore, it would have been obvious to combine Wu with Paulraj for the benefit of a network that uses random access packets, and receive and transmit operations that are all carried out on the same frequency channels for each link, to obtain the invention as specified in claim 11.

28. **Claims 13-15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Paulraj.

With regard to claim 13, Paulraj discloses a method as in claim 1.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include a proper subset that incorporates one or more nodes that are in a receive-only mode for every diversity capability means in Paulraj's method. The suggestion/motivation for doing so would have been to conserve resource and thus

maximize capability. Therefore, it would have been obvious to combine a proper subset that incorporates one or more nodes that are in a receive-only mode for every diversity capability means with Paulraj for the benefit of a proper subset that incorporates one or more nodes that are in a receive-only mode for every diversity capability means, to obtain the invention as specified in claim 13.

29. **Claim 33-38** are rejected under 35 U.S.C. 103(a) as being unpatentable over Paulraj in view of Frerking (U.S. Pat No. 5,649,286).

With regard to claim 33, Paulraj discloses a method as in claim 1. However, Paulraj fails to explicitly show suppressing unintended recipients or transmitters by the imposition of signal masking.

In an analogous art of wireless communication, Frerking discloses signal masking **(identification signal, col. 5, line 20, and a masking factor, col. 5, line 38)**.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include signal masking in Paulraj's method. The suggestion/motivation for doing so would have been to manage registration of a wireless communication unit in a geographical area served by a wireless communication system. Frerking, col. 4, lines 43-45. Therefore, it would have been obvious to combine Frerking with Paulraj for the benefit of signal masking, to obtain the invention as specified in claim 33.

With regard to claim 34 (1st occurrence), Paulraj discloses a method as in claim 1. However, Paulraj fails to explicitly show imposition of an origination mask.

Frerking discloses origination mask **(each cell is assigned a unique identification signal, col. 5, lines 13-14)**.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include origination mask in Paulraj's method. The suggestion/motivation for doing so would have been to manage registration of a wireless communication unit in a geographical area served by a wireless communication system. Frerking, col. 4, lines 43-45. Therefore, it would have been obvious to combine Frerking with Paulraj for the benefit of origination mask, to obtain the invention as specified in claim 34.

With regard to claim 34 (2nd occurrence), Paulraj discloses a method as in claim 1. However, Paulraj fails to explicitly show imposition of a recipient mask.

Frerking discloses a recipient mask **(a wireless communication unit receives an identification signal from the base station of a first cell and registers with the first cell, col. 5, lines 19-21)**.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include a recipient mask in Paulraj's method. The suggestion/motivation for doing so would have been to manage registration of a wireless communication unit in a geographical area served by a wireless communication system. Frerking, col. 4, lines 43-45. Therefore, it would have been obvious to combine Frerking with Paulraj for the benefit of a recipient mask, to obtain the invention as specified in claim 34.

With regard to claim 35, see analyses for claims 33 and 34.

With regard to claim 36, Paulraj discloses a method as in claim 1. However, Paulraj fails to explicitly show using signal masking to secure transmission against unintentional, interim interception and decryption by the imposition of signal mask at origination, the transmission through any number of intermediate nodes lacking said signal mask, and the reception at the desired recipient which possesses the correct means for removal of the signal mask.

Frerking discloses signal masking to secure transmission **(manage registration of a wireless communication unit in a geographical area served by a wireless communication system, col. 4, lines 43-45)**.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include signal masking to secure transmission in Paulraj's method. The suggestion/motivation for doing so would have been to manage registration of a wireless communication unit in a geographical area served by a wireless communication system. Frerking, col. 4, lines 43-45. Therefore, it would have been obvious to combine Frerking with Paulraj for the benefit of signal masking to secure transmission, to obtain the invention as specified in claim 36.

With regard to claim 37, Paulraj discloses a method as in claim 1. However, Paulraj fails to explicitly show a signal masking that is shared by a proper subset.

Frerking discloses a signal masking **(identification signal; masking factor)** that is shared by a proper subset **(wireless communication unit) (a wireless**

communication unit receives an identification signal from the base station of a first cell and registers with the first cell, col. 5, lines 19-21; see also a masking factor, col. 5, line 38).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include a signal masking that is shared by a proper subset in Paulraj's method. The suggestion/motivation for doing so would have been to manage registration of a wireless communication unit in a geographical area served by a wireless communication system. Frerking, col. 4, lines 43-45. Therefore, it would have been obvious to combine Frerking with Paulraj for the benefit of a signal masking that is shared by a proper subset, to obtain the invention as specified in claim 37.

With regard to claim 38, Paulraj discloses a method as in claim 1. However, Paulraj fails to explicitly show heterogeneous combination of a hierarchy of proper subsets, one within the other, each paired with a separate subset wherein the first is a transmit uplink and the second is a transmit downlink subset, such that the first subset of each pair of subsets is capable of communication with the members of the second subset of each pair, yet neither subset may communicate between its own members.

Frerking discloses heterogeneous combination of a hierarchy of proper subsets **(hierarchical number plan, col. 5, line 14).**

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include heterogeneous combination of a hierarchy of proper subsets in Paulraj's method. The suggestion/motivation for doing so would have been to manage registration of a wireless communication unit in a geographical area served by a

wireless communication system. Frerking, col. 4, lines 43-45. Therefore, it would have been obvious to combine Frerking with Paulraj for the benefit of heterogeneous combination of a hierarchy of proper subsets, to obtain the invention as specified in claim 38.

30. **Claim 40** is rejected under 35 U.S.C. 103(a) as being unpatentable over Paulraj in view of admitted prior art.

With regard to claim 40, Paulraj discloses a method as in claim 1. However, Paulraj fails to explicitly show using a water-filling algorithm to route traffic between an origination and destination node through any intermediate subset of nodes that has available diversity capability means capacity.

Admitted prior art discloses a water-filling algorithm **(well known 'water filling' solution, Specification, p. 18, para. 2)**.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include a water-filling algorithm in Paulraj's method. The suggestion/motivation for doing so would have been to maximize capacity communication over channels with frequency selective noise and/or channel distortion. Specification, p.18, para. 2). Therefore, it would have been obvious to combine admitted prior art with Paulraj for the benefit of a water-filling algorithm, to obtain the invention as specified in claim 40.

Allowable Subject Matter

31. **Claims 113 and 114** are allowed.

32. Claims 48-100,103,104,106,107,109,111,112,184 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

33. Claims 12,16,18, 116-179,182,183 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

34. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Blanche Wong whose telephone number is 571-272-3177. The examiner can normally be reached on Monday through Friday, 830am to 530pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on 571-272-3155. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BW
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HUY D. VU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600